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Newsline

CANADIANA
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ISSUES

Fitting women into the scientific equation

Most women avoid the sciences. That is fact. One has only to review the statistics available from our schools and universities – from our own organization (see sidebar).

Opinions as to why this is the case are plentiful, varied and often heated. They range from a lack of female role models to inappropriate teaching methods and sexist attitudes of professors and students. They include the erroneous belief that females are somehow "mentally inferior" to men and the fact that scientists and engineers are portrayed, particularly in the media, as "nerds" and, most often, men.

> *"Everyday, we hear comments such as, 'even my daughter may be interested in repairing bicycles', or 'it is delightful to see so many ladies at such a highly technical seminar'. The biased perception that females are not very scientific or technical is espoused to such a degree that many of us just accept it as fact."*
>
> *Dr. Nancy Cyr*
> *Manufacturing Technologies*

The factors affecting women's participation in the sciences are complex. It would be impossible to do the discussion justice within the confines of Newsline. (Anyone interested in a comprehensive review of the issue is referred to the September - October issue (Vol. 79) of "American Scientist", pp 104.)

Who suffers?

Suppose we accept the reality of the situation and agree with at least some of the probable causes outlined. One is still inclined to think yes, but is it really a problem? Perhaps women are simply less interested. Who gets hurt if they don't participate?

> *"The year I graduated high school in Poland, 50 per cent of the women in my class chose to continue with a university education. I once saw a Canadian yearbook from the same year. Only two women from that class wanted to go to university. The rest said they wanted to be secretaries, nurses and teachers. I found it surprising."*
>
> *Dr. Wanda Pawlak*
> *Coal and Hydrocarbon Processing*

Women suffer. They represent 50 per cent of our population and an increasingly large percentage of our work force (from 1975 to 1989 women, as a percentage of total labor force, increased from 36.9 per cent to 44.3 per cent).[*1] With little or no scientific training, many will find it more and more difficult to compete in an increasingly technical work environment.

"It's estimated that students who drop math and science in high school are cutting themselves off from 82 different types of jobs. In many of those jobs the demand is expected to rise, just as the demand for traditionally female occupations, such as telephone operator and typist, will steadily fall. In engineering alone, a shortfall of 30,000 to 40,000 engineers is expected within 10 years."[*2]

Industry suffers. A forecasted shortage of qualified engineers and scientists – the lifeblood of organizations like the Alberta Research Council – will hamper our ability to compete in world markets. Women's reluctance to enter these fields seriously depletes the total resource pool from which to draw qualified personnel and exacerbates the expected shortfall.

> *"There is an expectation that increasing the number of women practicing science will bring to these disciplines a broader spectrum of human values. To some extent, it will change how science is done as women will ask different questions and take different approaches. Presently, industry seems to recognize the value of getting a number of different approaches perhaps more so than the academic community."*
>
> *Dr. Margaret-Ann Armour*
> *Department of Chemistry*
> *University of Alberta*
> *Vice-chair, WISEST*
> *(Women in Scholarship, Engineering, Sciences and Technology)*

Society suffers. It is increasingly important in this technological age to have an informed public that can make knowledgeable decisions on issues involving science. Avoidance of the necessary subjects leads to greater scientific illiteracy among women and a largely uninformed voting public.

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AT A GLANCE

- ✶ Women in science
- ✶ Retirees Toshi and Max
- ✶ Appointments noted
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- ✶ Science fair winner visits
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and direct all questions to
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ALBERTA
RESEARCH
COUNCIL

What the Research Council is doing

The Research Council has traditionally supported programs aimed at increasing science awareness and interest. While no programs exist to target females specifically, the organization has become more concerned with and involved in affecting a positive perception of science and technology among Alberta's youth.

> *"In our society, occupations such as doctor, lawyer, athlete and business persons, seem to have more prestige. I think that positive promotion of science by government, industry and educators can go a long way toward changing this image."*
>
> *Lynn Sutherland*
> *Advanced Computing and Engineering*

In the corporate plan, *"A Vision to the Year 2000"*, the Research Council states its commitment to "influence a change in attitude among students in Alberta through increased linkage with schools, and by offering its facilities and staff to assist in developing a better science culture in the province."

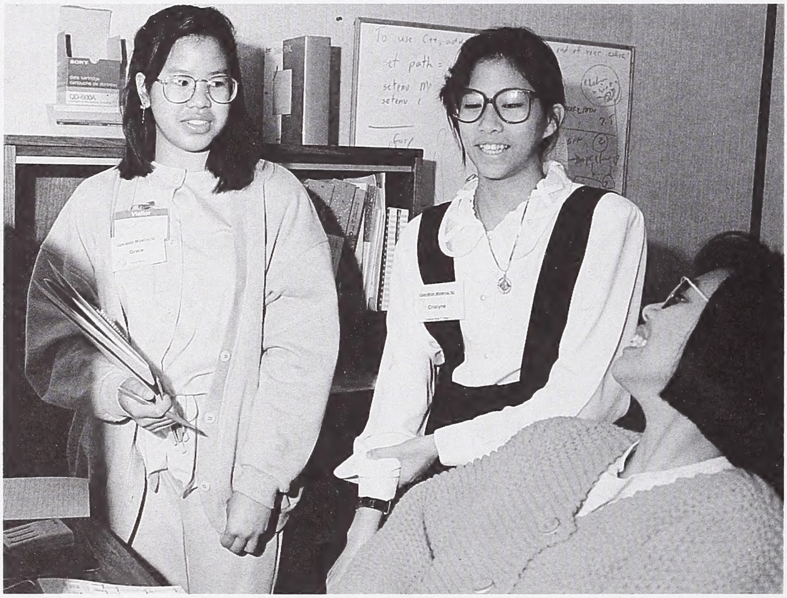
The Teachers' Research Experience Program, now entering its fourth year, is one such program. Each summer, Alberta science teachers have an opportunity to participate in a six-week project with Research Council staff. The payoff for youth comes in the fall, when these teachers return to the classroom with a new appreciation of and excitement for the sciences. And, as important, concrete examples of how scientific and technological knowledge is applied in the work world.

Super Science Kids' Day is another example of how we can establish a direct link with today's student and leave a lasting impression. Students from five Edmonton and area schools and two Calgary schools had an opportunity last fall to visit Research Council facilities, talk to scientific staff and see science in action.

Teachers and students participating in Super Science Kids' Day rated the experience highly. "[The] visit was very beneficial to our class. The relevance and excitement of science was very well illustrated." "I thought this was just great! I myself learned a lot and the kids were excited about their experiences. I think the more we can show kids what happens in science the better it will be. They saw science in action! That is important."

> *"My daughter's classroom was one of those chosen to attend Super Science Kids' Day last fall. She and her friends were extremely enthusiastic. She still talks about it."*
>
> *Dr. Shelley Lorimer*
> *Oil Sands and Hydrocarbon Recovery*

The corporation also supports Alberta science fairs, offers two university scholarships each year and hosts public open houses.



Eighth graders Grace Wong, left, and Crislyne Pham, centre, learn about project development and planning from Meg Mendoza, Advanced Computing and Engineering. Department researcher Lynn Sutherland, invited the Calgary-area students to visit the Research Council and job-shadow women scientists at work as part of her volunteer work with Operation Minerva, a program promoting education for women in science.

What can we do as individuals?

Each of us has an opportunity to interest young women (indeed all children) in science and technology – as parents, members of the community and employees of the Alberta Research Council.

As parents, we need to guard against biased language and behaviors which reinforce the message that science is no place for women. Examples include saying things like "little girls shouldn't play in the dirt" and "math won't be that important to you when you grow up"; or classifying toys as boys' (chemistry and mechano sets) or girls' (dolls).

> *"The literature that I have read on the subject indicates that by the age of 12 (Grades 6 and 7) we've already lost most girls in terms of math and science. If we are going to turn this around, we have to target younger children and find a way to make these subjects, particularly math, fun for them. We also have to work on changing the existing culture that causes girls to doubt their ability to succeed in math and science."*
>
> *Dr. Marlene Jones*
> *Advanced Computing and Engineering*

We can take an active interest in the standard of science education offered in our community. What kind of program does your local school offer? Are there opportunities for field trips and hands-on experience; are girls encouraged to participate? Is there any possibility of working with the school and local community

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ISSUES *(continued from page two)*

ALBERTA RESEARCH COUNCIL

Number of Alberta Research Council employees, by sex/position (1991) (*1983 comparison)

	Bd of Dir		Management		SRO	AssocRO	AssisRO	JrRO
	1991	1983	1991	1983				
Male	13	*15	21	*36	20	74	49	12
Female	2	*0	4	*3	1	6	13	2

** Note: While both female members of the Research Council's Board of Directors have scientific backgrounds, none of the four female managers currently working for the organization is trained in science or engineering.

Number of Alberta Research Council employees, by sex/education (1991) (*1983 comparison)

	PhD		MSc		BSc		Sc./ tech. diploma
	1991	1983	1991	1983	1991	1983	
Male	95	*88	68	*58	77	*54	112
Female	9	*3	14	*6	18	*8	33

ALBERTA HIGH SCHOOLS

Per cent grade 12 enrollment in math and science, Alberta, (1989/90)

	Chemistry	Math	Physics
Male	48	50	66
Female	52	50	34

35 per cent of science teachers in Alberta junior and senior high schools are female.

CANADIAN UNIVERSITIES

Enrollment (000s) across Canada, by level, subject and sex (1987)

	Bachelors	Masters	Doctorate	
Male/Female	308/307	32/26	12/6	all fields
	37/5.4	5/.8	2.3/.23	engineering/app. sc.
	24/10	2.7/.9	2.2/.44	mathematics/phys. sc.
	20/35	3/5	1.4/1.3	humanities

Degrees granted (000s) across Canada, by subject and sex (1987)

	Bachelors	Masters	Doctorate	
Male/Female	48/55	9/7	2/.7	all fields
	8/1	1/.2	.3/.02	engineering/app. sc.
	5/2	.9/.3	.4/.06	mathematics/phys. sc.
	4/7	.9/1	.2/.1	humanities

*** 1875: Mount Allison, New Brunswick, first institution in British Empire to grant a university degree to a woman. Graduating with a B.Sc. is Grace Annie Lockhart.

Per cent full-time university teachers who are female, by field (1987)

Education	27.1
Humanities	22.4
Social Sciences	17.6
Agriculture and Biological Sciences	17.0
Engineering/Applied Sciences	2.4
Mathematics/Physical Sciences	6.1

Number (000s) full-time university teachers, by rank/sex (1987-88)

	Full Prof.	Assoc. Prof.	Assis. Prof.	Lower Ranks
Male	12	10	5	.7
Female	.8	2	2	.6

ASSOCIATIONS

Per cent women belonging to scientific/engineering associations across Canada (1991)

APEGGA (Association of Professional Engineers, Geologists and Geophysicists of Alberta)	
– Engineers	3.6
– Geologists	7.4
– Geophysicists	5.2
– dual membership	4.1
Alberta Society of Engineering Technologists	5.0
Canadian Society for Industrial Engineering	10.4
Chemical Institute of Canada	14.3

groups to develop science-related programs.

By volunteering to talk to student groups on our own, or as part of other organizations' awareness programs, we can all contribute to a better appreciation of science and technology. Female employees, in particular, have an excellent opportunity to act as role models and to increase the visibility of women in science.

Fortunately, many Research Council employees already donate countless hours to the task of increasing young people's interest in science and technology.

> *"It is important to go out and talk to students in general. We need to stress the options, not the things that are out of reach. For instance, a lot of women fear they will have to give up family and children to have a career in science and technology. We have to let them know it's not impossible.*
>
> *"Men and women* **are** *different. We have to make careers available to both by appreciating the differences and working within these boundaries."*
>
> *Shelley*

Over the years, the number of women choosing to study and work in the sciences has remained low. Even so, there is reason to believe the tide is changing for the better.

Government, industry and our schools have begun to recognize the importance of encouraging young women to take an in-

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Retirees head for warmer climes on west coast

Dr. Toshi Kaneda, Lipid Biology, and **Max Baaske,** Alberta Geological Survey, have two things in common. Both recently retired from the Alberta Research Council with over 30 years of service and both plan to relocate in British Columbia.

Toshi joined the Research Council's Fuels Branch in 1960 as leader of the Microbiology Laboratory. For the next 24 years, he worked on a variety of projects related to Alberta's natural resources. An example is his study of the microorganisms capable of degrading plant porphyrin pigments and their relation to the genesis of petroleum porphyrins or components of bitumen – work believed to have application to oil sands development. He also isolated and identified ice-nucleating organisms that cause frost damage in Alberta crops.

In 1984, Toshi was appointed a Research Fellow with the corporation and given free reign to conduct basic research. He chose to devote his attention to the study of lipid biology, specifically, branched-chain fatty acids. This work is seen to have ongoing application in the development of a new canola oil for industrial use – paint additives, lubricants – and cold hardy grain crops.

This spring, Toshi was appointed an Emeritus researcher with the Alberta Research Council. He will remain in Edmonton until the end of June to complete writing a dozen or so papers based on his work.

Toshi says he is satisfied with his research and thankful to the Research Council for giving him an opportunity to contribute to the science. "I only have one life to live. Now, I wish to relax and see how the work I pioneered and developed is continued by others."

Once settled in B.C. with his wife, Hideko, Toshi would like to write a book in Japanese on his study of the bacterium *"Bacillus subtilis"*. This nutritional "bug" is inoculated on steamed soybeans to make a breakfast food, natto, in Japan. "I've worked with this bacterium for over 30 years and have lots of stories to tell about my experience."

He also plans to use CD technology to organize the thousands of photographs he has taken over the years.

Max and Mabel

Toshi

★ ★ ★

For Max and his wife, Mabel, retirement means the fulfillment of a long-standing dream – a move to Vancouver Island, where they have vacationed for the past 25 years.

Max joined the Alberta Research Council in 1957 as a geological technician, cutting petrographic thin sections. It turned out to be a 35-year career.

John Godfrey, a former colleague, says, "Max's sense of responsibility and care, his meticulous attention to detail, were obvious to many of us geologists right away. He must have participated in hundreds of research papers in one way or another throughout his career."

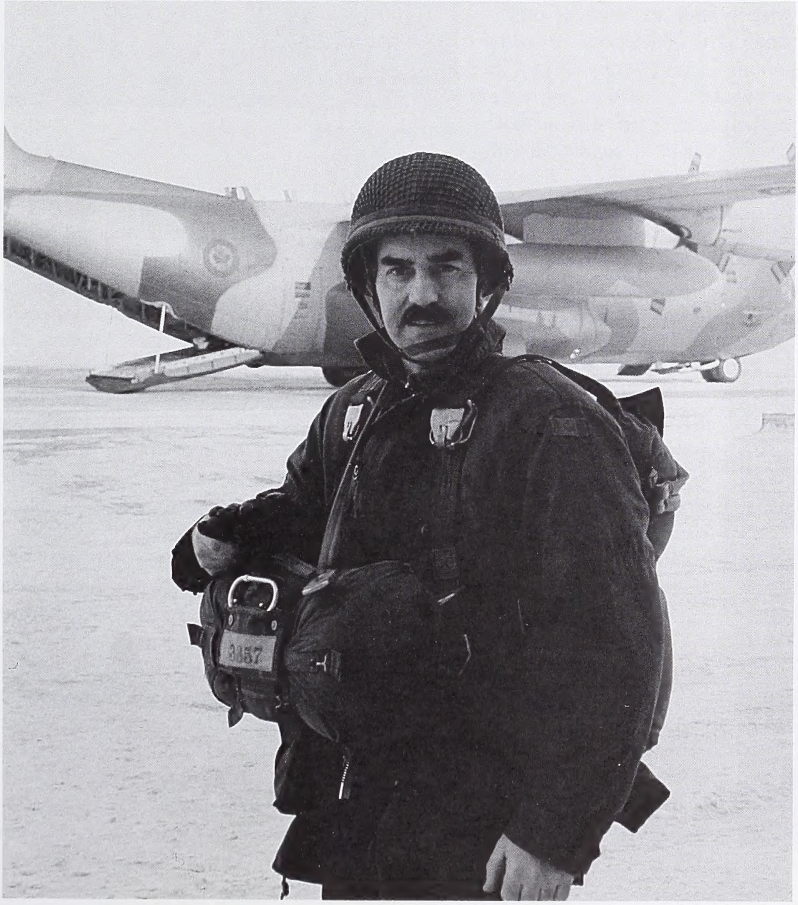
Max is also known for developing a method by which to obtain thin sections of northern Alberta oil sand. "Before that time, it was simply accepted that it was not possible to cut thin sections of this material," Max says. "Consequently, little was known about the petrography of the sand stone in which oil sand is found. Of course, things have progressed quite a bit since I first developed my method."

After 35 years doing one job, Max says it's time for a change. "Now, I'd just like to get work out of my system." He plans to spend his time in the pursuit of his many hobbies, which include fishing for salmon, canning sea food, lapidary, silversmithing and gardening. He is also looking forward to working with some of the many species of wood available on the island and to moving into their new home, currently under construction in French Creek (between Parksville and Qualicum Beach). ❐

PROFILES

Normand J. Lanctot

Title/department:	Stores clerk/Administrative Services
Responsibilities:	To ensure store services, in all aspects, provide efficiency and integrity
Length of service:	4 years
Philosophy on life:	A smile is worth a thousand words
Greatest accomplishment/ experience at ARC:	To bring morale up by offering a sense of humor and a joy for living
Current projects:	Safety awareness/teamwork; shop steward, representing Mill Woods and Devon staff
Career background/ previous employers:	Maintenance officer Health and Welfare Canada
Favorite book/author:	"The Camera", Ansel Adams
Favorite movie:	"Les Parapluies de Cherbourg"
Hometown/background:	Joliette, Quebec
Childhood ambition:	To play for the Montreal Canadiens
Favorite vacation:	Israel/Egypt/Jordan
Special awards/ accomplishments:	Airborne - Loyal Edmonton Regiment 49, First Aider - St. John's Ambulance, NIGP - Public Purchasing and Materials Management
Family:	Wife, Anita, two sons, Matthew and Gilles
Hobbies:	Tai Kwon Doe/photography/jumping-paratrooper/ reading/jogging/snowshoeing/camping



ON THE MOVE

Appointments, promotions, achievements...

Dr. Rand Harrison began a two-year secondment to Alberta Technology, Research and Telecommunications (TRT) April 21, 1992, as an assistant deputy minister. He is now responsible for TRT's business development activities, marketing and technology transfer initiatives.

Rand joined the Research Council in 1980. He was first seconded to TRT from 1988 to 1990, where he acted as a senior advisor to that department on issues related to science and technology. When he returned to the Research Council in 1990, he was appointed head of the Alberta Geological Survey.

★ ★ ★

Dr. Jan Boon has replaced Rand as head of the Alberta Geological Survey. In addition to his duties as department head, Jan will continue to advance the Research Council's international activities and contacts.

Since September 1990, Jan was director of Development and Planning where he was responsible for alliances, international affairs and business development. He played an important role in the development of the Research Council's corporate plan.

★ ★ ★

Dr. Ted Heidrick has been appointed director of Corporate Marketing for the Alberta Research Council, effective May 4, 1992. The position is new to the organization's Development and Planning portfolio and is consistent with the commitment made in *'A Vision to the Year 2000'* to enhance development and planning initiatives."

Ted will be responsible for strategic market assessments, the review of marketing strategies and plans, and the identification of overlaps and gaps within the corporation's marketing and development structure. He will also be called upon to identify additional business opportunities for the Alberta Research Council and to provide marketing support services.

Ted was most recently head of the Manufacturing Technologies Department.

★ ★ ★

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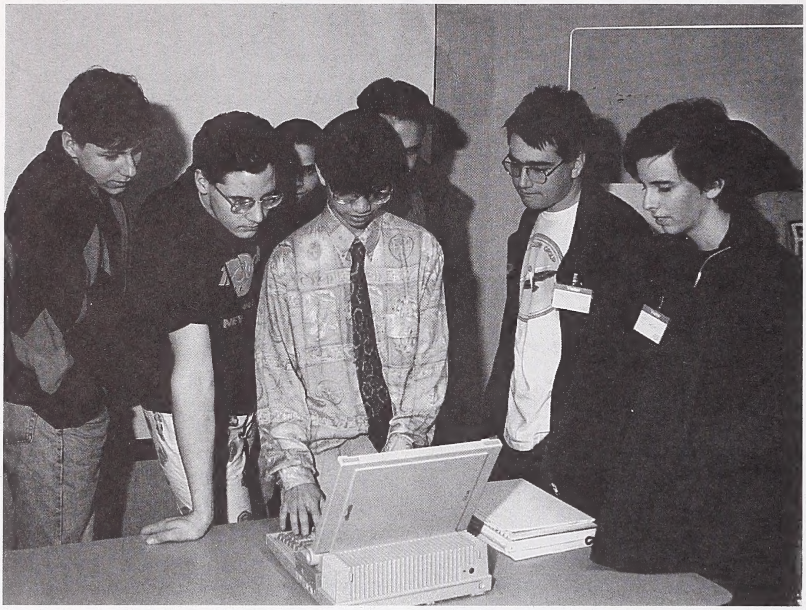
CORPORATE NEWS

Science fair winner visits



***Felix Lee** (centre), a Grade 12 student from Lord Beaverbrook High School, won the Alberta Research Council-sponsored award for best applied computing project at the 1991 Calgary Youth Science Fair. He, along with 18 of his classmates and two teachers, visited the Calgary office to demonstrate his winning project, "Predicting natural distribution: a statistical analysis of fractal patterns".*

ISSUES

(continued from page one)

terest in science and technology. Programs like WISEST, run by the University of Alberta in Edmonton, and Operation Minerva, coordinated by science teachers in Calgary, have been established to do just that.

Of the few women who have chosen to pursue a scientific career, some, such as Dr. Roberta Bondar, have received wide recognition for their accomplishments. Such role models do much to increase the visibility, possibility and desireability of being a women in science.

In the final analysis, it is still up to the individual female to make the choice to pursue science and technology and to do the necessary work. Whether the choice is based on interest created through programs, greater availability of exciting role models, or the desire to get a good job in the future, this writer believes more women will chose to do so in the years ahead. Time will tell.

> *"I believe younger women are already taking more of an interest in science. When, in 1986, I attended my first professional conference in North America, there were two women out of some 150 attendees. At the same conference four years later, there were 15 women. The majority of these were younger - newcomers to the field."*
>
> *Wanda*

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*1. "Women in the Labour Force". Ottawa. Labour Canada. 1990-1991 edition.

*2. "Canadian Living", April 1991, p. 118, Marcia Kaye, Girls = Science, Help make your daughter a part of the equation. ❐

ON THE MOVE

(continued from page five)

Rick Richardson has been promoted from Associate Research Officer to manager with the Alberta Geological Survey.

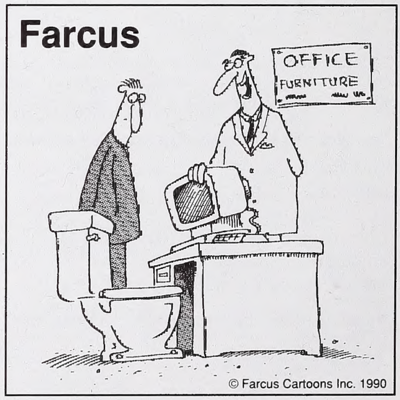
★ ★ ★

Janis Koehler, manager of Occupational Health, Safety and Hygiene, was recently recertified as a COHN (Certified Occupational Health Nurse) by the American Board for Occupational Health Nurses. Certification is a voluntary process. Only 11 per cent of nurses employed in occupational health settings are board certified.

Recertification, required every five years, is based on knowledge maintenance through continuing education and professional activities – a demonstration of the individual's commitment to quality health care for workers and businesses. ❐

Employee changes

We wish the following well in their future endeavors: **Pat Aberle,** Coal and Hydrocarbon Processing; **Sylvia Andrews-Smith,** Environmental Research and Engineering; **Max Baaske,** Alberta Geological Survey; **Dixon Fong,** Coal and Hydrocarbon Processing; **Dr. Toshi Kaneda,** Lipid Biology; **Roman Krzanowski,** Environmental Research and Engineering; **Dr. Richard Petela, Dr. Slobodan Petrovic and Dr. Mian Rashid,** Coal and Hydrocarbon Processing; **Jack Wilkinson,** Advanced Computing and Engineering.



It'll cut down on the number of work breaks!